National Institute of Environmental Health Sciences

Short-term effects of summer temperatures on mortality in Portugal: A time-series analysis

Author(s): Almeida S, Casimiro E, Analitis A
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Abstract:

Heat stress is a current public health concern during the warm months in many urban areas. Climate change and increasing urbanization are expected to worsen this concern, with some locations being more vulnerable than others. The aim of this study was to determine the short-term effect of heat on mortality in the two most populated cities in Portugal: Lisbon and Oporto. Each city was assessed for specific heat stress threshold above which heat-related mortality becomes significant. A Poisson generalized estimating equations (GEE) model was used to estimate the impact of maximum apparent temperature (ATmax) and maximum temperature (Tmax) on daily mortality, in the summer season. Data show ATmax thresholds of 30.4 degrees C for Lisbon and 26.3 degrees C for Oporto, and Tmax thresholds of 29.3 degrees C and 25.0 degrees C, respectively. For every 1 degrees C elevation in ATmax above the city-specific threshold, all-cause mortality rate rose by 7.13% (95% CI: 5.9; 8.4) in Lisbon and 4.31% (95% CI: 3.2; 5.4) in Oporto. The Tmax threshold increases were 5.6% (95% CI: 4.6; 6.6) in Lisbon and 3% (95% CI: 2.0, 3.9) in Oporto. In both cities, stronger associations were found for respiratory diseases and the elderly group was the most vulnerable. This study confirmed that elevated temperatures have a considerable impact on daily mortality frequency in the two most urbanized areas in Portugal. Our results also provide useful data for policymakers to better prepare local actions to mitigate and reduce the health risks associated with high temperatures.

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Resource Description

Early Warning System:

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure :

weather or climate related pathway by which climate change affects health

Temperature

Temperature: Extreme Heat

Geographic Feature:

resource focuses on specific type of geography

Urban

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Europe

European Region/Country: European Country

Other European Country : Portugal

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Respiratory Effect

Respiratory Effect: Other Respiratory Effect

Respiratory Condition (other) : general respiratory disease

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Population of Concern: A focus of content

Population of Concern: ☑

populations at particular risk or vulnerability to climate change impacts

Elderly

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content